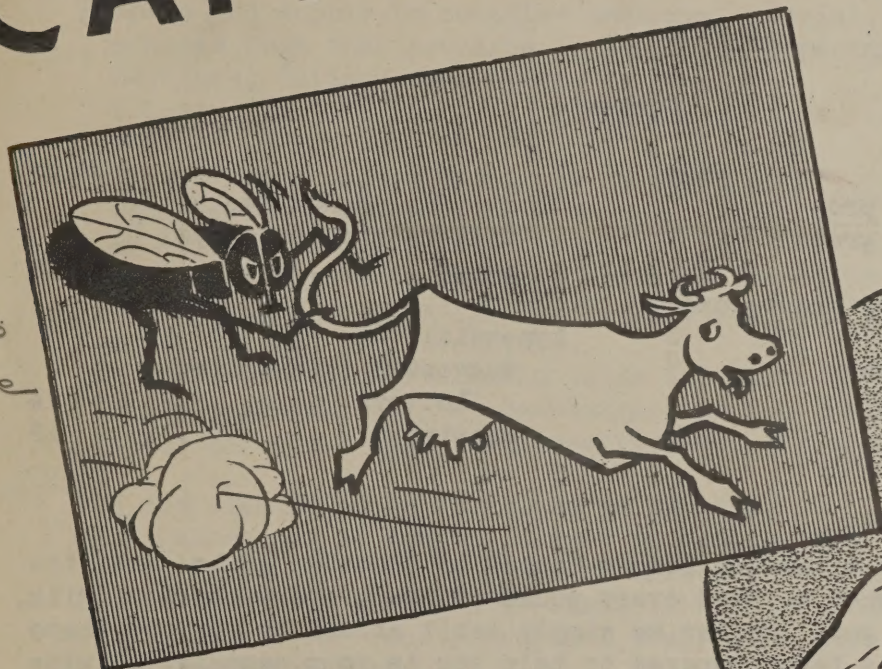
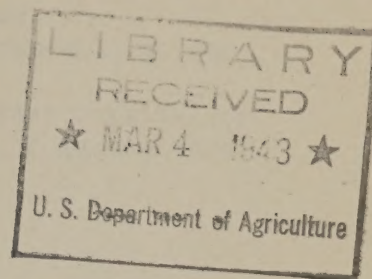


1.913  
E3C76  
Reserve

# CONTROL CATTLE GRUBS



HEEL FLY -  
THE PARENT OF  
CATTLE GRUBS



*Organize your State, county, and community.  
Fight on the home front. Kill the grubs in the  
backs of cattle. Our Nation needs more beef,  
milk, and leather in its war effort. For help  
see your county agent.*

UNITED STATES DEPARTMENT OF AGRICULTURE  
U.S. Extension Service, Bureaus of Entomology and Plant Quarantine,  
Dairy Industry, Animal Industry cooperating.

USDA  
LIB



CONTROL CATTLE GRUBS  
MANUAL FOR COUNTY AGENTS

Contents

	Page		Page
Suggested outline of procedure for cattle grub control program		Shorts for the column or fillers for the newspaper . . . . .	13
Inside front cover			
Text . . . . .	3	Appendix:	
Suggested news stories . . . . .	7	Suggested illustrated letters . . . . .	14
Suggested instruction leaflet . . . . .	11	Drawings . . . . .	19

- - - - -

In ordinary times the losses caused by cattle grubs are too large. In wartime, when we need every pound of meat, every quart of milk, every square inch of good leather, we simply can't afford to support these pests. This manual has been prepared to help you in your campaign to wipe out the grub in your county.

A brief review of the life cycle of the grub may be in order. First visible indication is the appearance of the heel fly. Cattle instinctively try to get away from it, into a shady place in the bushes or into water. There is no evidence that the operations of the fly at egg-laying time hurt the cattle, but instinct warns them that this particular buzz portends an uncomfortable future existence.

The fly lays her eggs on the hairs of the lower leg. There the larvae enter the flesh and travel through the tissues to the gullet, thence to the back, where the grubs complete their development and emerge, leaving a hole in the hide. On the ground the grubs pupate and the fly emerges to repeat the cycle.

---

Distribution. A copy of this pamphlet has been sent to each State extension director, editor, entomologist, animal husbandman, dairy husbandman, county agent leader, district agent, county agent, and 4-H Club leader and district agent.

---



Suggested Outline of Procedure for Cattle Grub Control ProgramState

- Conference of entomologists, animal husbandmen, dairy specialists, veterinarians, both extension and research, county agent leaders, and district agents to outline procedure for control program.
- Set up a State cattle grub control committee.
- Provide for cooperation with all interested agencies.
- Select counties where need is most urgent and program will be carried out most effectively.
- Prepare and supply to counties teaching material, either original or adapted from that prepared in the U. S. Department of Agriculture.
- Leaflets, folders, bulletins.
- Illustrated letters for neighborhood leaders.
- Posters.
- Exhibits and window displays.
- Color slide series.
- Motion pictures for next year.
- Prepare and supply to counties articles for daily and weekly papers or use those prepared by the U. S. Department of Agriculture.
- Prepare and deliver broadcasts.
- Supply to county agents radio talks and skits.
- Provide technical help at demonstrations and meetings.
- Arrange for local supplies, insecticides, and equipment.

County

- Run articles in paper (build-up to program).
- Hold conference of county leaders to outline need for program.
- Set up organization (community or neighborhood leaders).
- Assist in making supplies of insecticides and equipment available.
- Outline plans for county program, keeping in mind desirability for area basis of control.
- 1. Provide publicity material or use Federal articles for local newspapers and radio.
  - Need for program.
  - Progress of program.
  - Results of program.
- 2. Prepare teaching material.
  - Leaflets for neighborhood leaders.
  - Exhibits and window displays.
  - Color slide series.
  - Motion pictures for next year.
- Arrange for meetings and demonstrations.
- Train demonstration teams, junior and adult.
- Distribute posters and teaching material for use of banks, stockyards, cattle trucks, and other places.
- Establish control calendar and send out notices indicating date of treatment.
- Collect information on number of cattle treated.
- Make photographs for future use.
- Report progress of program to State office.

This manual has been prepared to assist the county agent in conducting the publicity phases of his program.

APR 13 1943



In the back is where the pests can be most easily controlled, before the grubs emerge. This of course does not help the infested animal, but it does help to check further infestation of the herd. The control measures are not costly nor do they require any special equipment.

Control can best be achieved through education, and the quickest education is by means of publicity. This manual contains a series of suggested news stories, a series of suggested illustrated circular letters, a suggested poster (the cover page), and drawings. Surveys show that only a few counties are free of cattle grub, and the manual is being sent to all counties within the continental United States.

When you as a county agent plan a campaign to control the cattle grub, lay out a definite program so you won't miss a single available channel. Look on your various outlets as part of a complete weapon and use each type of ammunition in as effective a manner as you can. Don't fire all your guns at once, though. Spread them out and let each one support the other. Let us assume you have five publicity channels available to you--the weekly paper, your weekly radio program, circular letters, store-window displays, and meetings or demonstrations. (Yes, we know there is a war on and rubber is scarce, but we'll give you an idea for getting around that.) Let us see how we can tie them together for the campaign.

Make your localization of the news stories, modifying them to fit local conditions. Add local evidence of cooperation whenever possible. Do a rewrite in your own language of the same stories for use on your radio program. Get the first of the circular-letter series ready for mailing. Suggest to the local stores selling the materials that they prepare window displays and feature the campaign in their advertising. (The editor of the paper may want to take over this end of it for you. He may even want to arrange a cooperative advertisement on the campaign.)

Then, when everything is ready, break the first story in your column in the paper. Follow this a day or so later with the first letter. The first radio program after the story appears in the paper should also feature the campaign. Repeat this treatment the second and third weeks.

Now for the fifth channel. Instead of asking farmers to come out to a meeting or demonstration with consequent use of rubber and gas, have your meeting as an all-day affair in town on Saturday. This can be a regular meeting, but more farmers will be reached if you have a demonstration going on all day long, at definite intervals. In preparation for the meeting there are many things you can do. Here are some of them:

Prepare simple mimeographed instructions like the sample leaflet reproduced later. Have enough to hand out to all who are interested.

Get a piece of finished leather which shows grub damage.



Get a piece of fresh hide with the grubs in it, and if the weather is not too warm, a piece of meat showing grubs in the tissues.

Have several farmers bring infested cattle on which you can demonstrate.

Have sample batches of each of the prescribed remedies in sufficient quantities that they may be inspected by feel and smell.

Have a map of the county mounted on a suitable stand or wall and a supply of map pins. Put red pins wherever you know there is an infestation. Where the farmer has already started a control program, stick a blue pin alongside the red. As others who visit the demonstration agree to start control measures, put a green or orange pin alongside the red. If any farms have been cleared of infestation, or have brought the grubs under control in earlier campaigns, put a white pin in them. This map affords an incentive, a spirit of competition.

Have a large sign made, one to hang over the demonstration. Let it read, "Cattle Grubs Eat Meat--Squeeze 'Em Out," or something similar. Provide small cards for each of the remedies, and a "Take One" for the mimeographed instructions. The directions for each remedy can be lettered on large cards and displayed around the area. Paste the picture of the "Jap Heel Fly" and the "Hitler Grub" on other cards and letter under them: "He doesn't like shade or water; give your cattle a chance," and "Squeeze him out of his hole and his children won't run your cattle next year." Hang these in convenient places. The smaller pictures of shade and water can be pasted on the lower corners of the heel-fly poster, and the picture of the squeeze play can be put on the other. By this stage of the campaign you will have used them in your letters and your farmers will be quick to recognize the originals.

Provide a clock card with a sign "Next Demonstration" if you are using live animals. At the indicated times you should plan your demonstration to allow time for a good crowd to gather before the actual control is shown. The necessary action can be supplied by showing the damaged leather, the grubs in the hide, an egg cluster on hair, and similar interest-getting exhibits. When a sufficient number have gathered, show them how the powder is applied and how to squeeze a grub.

As you finish with this, show the remedies, possibly passing small samples through the crowd for inspection. Call attention to the free instructions, then to your map of the county. Ask each farmer if he noticed heel flies last spring and if he has noticed the other symptoms since. Stick up the red pins as each one locates his farm. If he agrees to do something about it stick up the proper pin.

Naturally, in offering these suggestions, it is realized that many agents will not be in a position to use all the suggestions. They are offered as just that, for whatever use you can make of any of them.



We would suggest, however, that you keep your entomologist and editor informed of what you are doing so they may pass the word on to other agents in the State.

The timing of your whole campaign is important. Your first mention should anticipate the appearance of the grubs so that your action program can be effective during the 1 or 2 months before the grubs drop to the ground. Be ready for those first warm days when the flies are active with warnings about shade.

Several sample letters are included in the appendix. Different treatments are shown in each letter. You can prepare other letters by using the drawings in the appendix or those to be found in earlier manuals, especially the patriotic drawings in the original Food for Freedom Visual Aids Handbook. Other treatments can be shown in these other letters. Please note that some remedies are planned for the farmer with a few head, others for handling large herds. Also note that the letters can be fitted into local conditions by substituting milk for meat and beef for dairy, and vice versa.

The news stories that follow are written in a rather formal "release" style. If you conduct a column be sure to rewrite them in your own friendly style. The stories are run in consecutively, to save text space, but you will want to copy them anyway as you revise them to adapt to your local needs.

In case you are still holding meetings, the Federal Extension Service has prepared a new slidefilm on cattle grubs, in both single- and double-frame size, which you might find helpful in promoting your campaign.

- - - - -

This manual is based on original material suggested by D. S. Carpenter, County Agricultural Agent, Anderson County, Tex., and by E. W. Laake, Senior Entomologist, Bureau of Entomology and Plant Quarantine. Text by M. P. Jones, Senior Entomologist, Extension Service, and Don Bennett, In Charge, Visual Aids Section; edited by Katherine Heinold; drawings by Mary B. Sawrie, Gertrude Power, and Mona Bennett.

In order to conserve paper, the illustrated sample letters in the appendix have been printed on both sides of the sheet. If you desire to use them, trace the drawings on tissue paper for transferring to your stencil.



(First news story. Adapt for radio use.)

CATTLE GRUBS STEAL MEAT (MILK)\*  
NEEDED IN WAR EFFORT

An infestation of cattle grubs may be expected to appear within the next month, according to County Agent \_\_\_\_\_. These grubs, often called "wolves" because of the amount of meat they consume while harbored in the body of meat animals, are responsible for considerable sabotage of the war effort.

Entomologists estimate the annual loss due to the activity of this pest reaches a sum of more than 50 million dollars in loss of meat, milk, and hides. In peacetime that represents a considerable loss for the farmer, but in wartime it is plain sabotage. Beef animals do not make the proper gains, dairy cattle fall off in milk production, and the emerging grubs riddle thousands of hides.

The control of the pest is neither costly nor difficult, Mr. \_\_\_\_\_ advises. While all the damage to this year's animals cannot be prevented, there is still time to prevent further loss of meat, leather, and milk. Reinfestation and the spread of the infestation can be reduced to the vanishing point, provided simple steps are followed by all farmers in the county.

The grub in the back develops from eggs laid 7 or 8 months ago by the heel fly. The larva travels through the animal until it reaches the back, where it emerges as a grub. It is at this point that control measures are applied. The treatment takes the form of dusting, spraying, or scrubbing with cube or derris, injecting benzol, or hand extraction.

Directions for the five types of remedy have been prepared and may be obtained from your county agent at his office in the courthouse.

\*Adapt to your local needs.

- - 0 - -

(Second news story. Adapt for radio use.)

DRIVE ON TO CONTROL  
CATTLE GRUBS

County Agent \_\_\_\_\_ has announced the start of a campaign to control the cattle grub. This pest of beef (dairy)\* animals causes the loss of millions of pounds of meat (milk)\* each year. The War Production Board, realizing the need for controlling the pest, has released some rotenone for this purpose.



The campaign in \_\_\_\_\_ County will run from \_\_\_\_\_ to \_\_\_\_\_, the usual time when the pest is in the grub stage and can be reached with simple and inexpensive treatment. A powder mixture made of equal parts of wettable sulfur and cube or derris powder containing 5 percent rotenone applied to the backs of affected animals will kill the grubs; or the grubs can be removed from the open sores by squeezing.

Treatment by liquid spray also is possible. Mr. \_\_\_\_\_ has prepared a leaflet containing instructions for all accepted methods. During the campaign, all animals brought to the \_\_\_\_\_ community pens will be inspected and treated if found to be harboring grubs.

\*Adapt to your local needs.

- - 0 - -

(Third news story. Adapt for radio use.)

#### GRUB CONTROL TO BE SHOWN AT COURTHOUSE

In keeping with the times, County Agent \_\_\_\_\_ plans to save the tires and gas of farmers interested in getting rid of cattle-grub infestations by arranging an all-day demonstration in the parking lot back of the courthouse Saturday, \_\_\_\_\_.

Several infested animals will be on hand so farmers may see how the control measures are applied. Samples of damaged hides, the various remedies, and other interesting exhibits will be available all day. Demonstrations of control measures will be given every hour, starting at 9 a. m.

Many farmers in the county have already taken steps to control the grubs, following instructions supplied by Mr. \_\_\_\_\_. "J. F. Knowles" has dubbed one of his grubby steers "War Bond" and is penalizing himself a war savings stamp for every grub he can get out of the animal. He says, "This is one penalty that works both ways. Uncle Sam gets my money when he needs it, I'll have the war bond, and the grubs won't develop into flies to riddle my beef and leather next year. Grubby leather won't make shoes for soldiers, but the Army can walk on my herd next year."

- - 0 - -

(News article. For use when deemed best.)

#### HEEL FLY ATTACKS MEAN GRUBS NEXT YEAR

A sharp "zing" is heard and a heifer lifts her tail over her back in a peculiar position looking something like a question mark as she



dashes off for the nearest shady spot. To the trained eye that is ample proof the heel fly is abroad again.

Several months ago cattle grubs crawled from their hiding place on the backs of animals and dropped onto the ground for further development. When that development was complete the heel fly emerged and started looking for places to deposit her eggs. Her favorite spot is on the hair just above the heels of beef and dairy animals. The animals seem to know what is before them and flee the attack.

After a few warm days the eggs hatch and the larvae enter the soft skin around the heel and travel through the tissues to the gullet. Contrary to popular opinion, they do not get into the gullet when the animal licks the entrance wound. The larva spends 7 or 8 months in the tissues of the animal and then moves to the back where it bores holes in the hide and prepares for its next stage, as a grub. At this stage in its life it can be controlled.

Control measures include working a grub-killing powder into the hair on the back of the animal or spraying with a mixture that poisons the grubs.

- - 0 - -

(News article. For use when deemed best.)

#### SOME RECOMMENDED CONTROLS FOR CATTLE GRUBS

Several treatments are recommended for the control of the cattle grub. Some are suitable for use with single animals or small herds, others are designed for large-scale operation.

##### Hand Extraction

During the present emergency, farmers with only a few head of cattle would do well to squeeze out by hand the grubs they find in the backs of animals. By persistent effort it is possible to squeeze out all grubs and prevent them from changing to heel flies.

##### Oilcan Treatment

Commercial benzol, when used in a common oilcan, has been useful in killing cattle grubs. The can should have a very small spout so that it can be inserted in the grub holes. About 20 drops of benzol is the desired amount to inject in each grub hole. This is the least amount you could inject with an oilcan with one squeeze. Benzol is inflammable, even more so than gasoline; therefore care must be taken not to expose it to fire.



### Scrubbing Method (Cube or Derris)

Mix in 1 gallon of water 12 ounces cube or derris (5 percent rotenone) and either 2 ounces of soap or 6 ounces of wettable sulfur. Dissolve the soap in warm soft water. Add a small amount of the soapy water to the powder to make a paste. To this add the remainder of the water and stir well.

If sulfur is used, mix the powder and sulfur together. Add water slowly, making the mixture into a paste before adding all the water. It is better to use sulfur if the water is hard, because soap causes the material to clot and settle, which reduces its effectiveness. This amount is sufficient to treat from 12 to 16 head of cattle, depending on the length and thickness of the hair and the size of the animals.

The least expensive equipment for applying cube or derris to the backs of cattle is a screw-topped fruit jar and a scrub brush. From the outside of the jar lid punch about 20 holes with a 16-penny nail. Remove about every other tuft of bristles from a stiff-bristled scrub brush. While scrubbing the cow's back with the brush in one hand, continue to sprinkle on the solution from the jar with the other hand.

### Cattle Grub Powder

Sift into the hair along the infested area of the back about 1 ounce of a dry mixture of equal parts by weight of wettable sulfur and cube or derris powder. The powder should contain 5 percent rotenone. Rub the mixture gently into the hair so it will reach the grub holes. Make the first application as soon as the first grubs appearing in the back are of a dark brown color and repeat the treatment every 30 days as the grubs show up in the back. A home-made quart-jar sifter can be made by punching about 25 quarter-inch holes in the jar top. Punch the holes from the inside.

### Spraying Method (Cube or Derris)

An ordinary power-operated orchard sprayer, with at least 250 pounds of pressure and a number 5 (5/64 inch) disk in the nozzle, will do the trick. One hundred gallons of the spray should treat from 150 to 175 head of cattle. Best results will be obtained by directing the spray to the backs of the cattle where grubs occur, holding the nozzle about 2 feet from the animal.

Mix 10 pounds wettable sulfur with 5 pounds of derris or cube powder (5 percent rotenone). Run 100 pounds of water into the spray tank. From this tank add enough water to the mixed powder to make it into a thin paste and pour the paste into the spray tank while the agitator is running.



# HOW TO CONTROL GRUBS

**WHEN TO LOOK** If you saw signs of the heel fly last year--watch for grubs this winter and spring. One sure sign of the heel fly is this: Animals run as if a demon were chasing them, usually with the tail held high over the back. Watch for signs of the grubs themselves on the backs of your animals. Bumps will appear along both sides of the spine. Lay the hair back and you may find holes with the grubs making their first appearance.

**CONTROL MEASURES** The grub is most easily controlled when it is in the back of the animal. Any of the treatments given below will kill the grubs and prevent development of more heel flies to infest your animals. Follow these simple instructions, and by all working together we reduce the losses suffered by farmers in this county.

## Hand Extraction

During the present emergency, farmers with only a few head of cattle would do well to squeeze out by hand the grubs they find in the backs of animals. By persistent effort it is possible to squeeze out all grubs and prevent them from changing to heel flies.

## Oilcan Treatment

Commercial benzol, when used in a common oilcan, has been useful in killing cattle grubs. The can should have a very small spout so that it can be inserted in the grub holes. About 20 drops of benzol is the desired amount to inject in each grub hole. This is the least amount you could inject with an oilcan with one squeeze. Benzol is inflammable, even more so than gasoline; therefore care must be taken not to expose it to fire.

## Cattle Grub Powder

Mix together by weight equal parts of either derris or cube containing 5 percent rotenone. Remove the top of a screw-topped jar, punch about 25 quarter-inch holes from the inside of the lid to make a shaker, and into this put the powder. Smaller holes would necessitate more shaking, which would waste material and would cause a cloud of dust irritating to the operator.

One pound of dust will treat about 15 head of cattle. Repeat this treatment every 30 days from the time the first grubs are dark brown in color, and continue as long as the grubs show up in the back.



### Scrubbing Method (Cube or Derris)

Water . . . . .	1 gallon
Cube or derris (5 percent rotenone) . .	12 ounces
(soap . . . . .	2 ounces
Either (	or
(wetttable sulfur . . . . .	6 ounces

To mix, dissolve the soap in warm soft water; then add a small amount of the soapy water to the powder, and make it into a paste; then add the remainder of the water and stir well.

If sulfur is used, mix the powder and sulfur together. Add water slowly, making the mixture into a paste before adding all the water. It is better to use sulfur if the water is hard, because soap causes the material to clot and settle, which reduces its effectiveness. This amount is sufficient to treat from 12 to 16 head of cattle. While scrubbing the cow's back with a stiff-bristled brush in one hand, sprinkle the solution from a shaker-top jar with the other hand. Continue this practice until the solution has been worked through the hair onto the skin wherever the grubs occur.

Each quart of liquid should treat about three head of cattle. If properly done, the scrubbing will loosen the scab over each grub and allow the rotenone suspension to penetrate sufficiently to kill the pest. Most of the dead grubs will eventually come out through the opening, and the opening will gradually heal over with scar tissue.

### Spraying Method (Cube or Derris)

An ordinary power-operated orchard sprayer, with at least 250 pounds of pressure and a number 5 (5/64 inch) disk in the nozzle, will do the trick. One hundred gallons of the spray should treat from 150 to 175 head of cattle. Best results will be obtained by directing the spray to the backs of the cattle where grubs occur, holding the nozzle about 2 feet from the animal. Here is the formula for mixing the spray materials:

Derris or cube powder (5 percent) . . . .	5 pounds
Wetttable sulfur . . . . .	10 pounds
Water . . . . .	100 pounds

Mix the sulfur with the derris or cube powder, then put the correct amount of water in the spray tank. From the spray tank add enough water to the mixed powder to make it into a thin paste. Pour the paste into the spray tank while the agitator is running.

**HEEL FLY CONTROL** Heel-fly attacks can be expected about a month or so after the grubs drop to the ground. Chances of attack are lessened if your animals can find refuge in a shady place or in a pond. If your feed lot or pasture has no natural shade during the heat of the day, provide it by erecting a post and slab shelter or shelters. In the feed lot and in small pastures a roof over a corner of the fence will do the job.



SHORTS FOR THE COLUMN OR FILLERS FOR THE PAPER

Heel-fly attacks now mean cattle grubs next fall. Is there enough shade for your animals?

- - 0 - -

There's no reason why we should share our meat with cattle grubs. Patriotic farmers can be thrifty, too, by getting rid of grubs. Your county agent can tell you how.

- - 0 - -

Did you know that leather is important? A soldier wears out a pair of shoes a month. Cattle grubs have ruined a lot of good shoe leather. They are saboteurs and should be wiped out. Ask your county agent.

- - 0 - -

Save your cattle grubs in a jar. Penalize yourself a 10-cent war stamp for each one. That will help pay for the damage you let them do to meat, milk, and leather. If your animals are free of this pest, buy a war bond to celebrate.

- - 0 - -

Here's a better kind of "squeeze play." Squeeze out the cattle grubs. While you can't patch the holes, you can cheat them out of more of the meat they've been eating free from your animals.

- - 0 - -

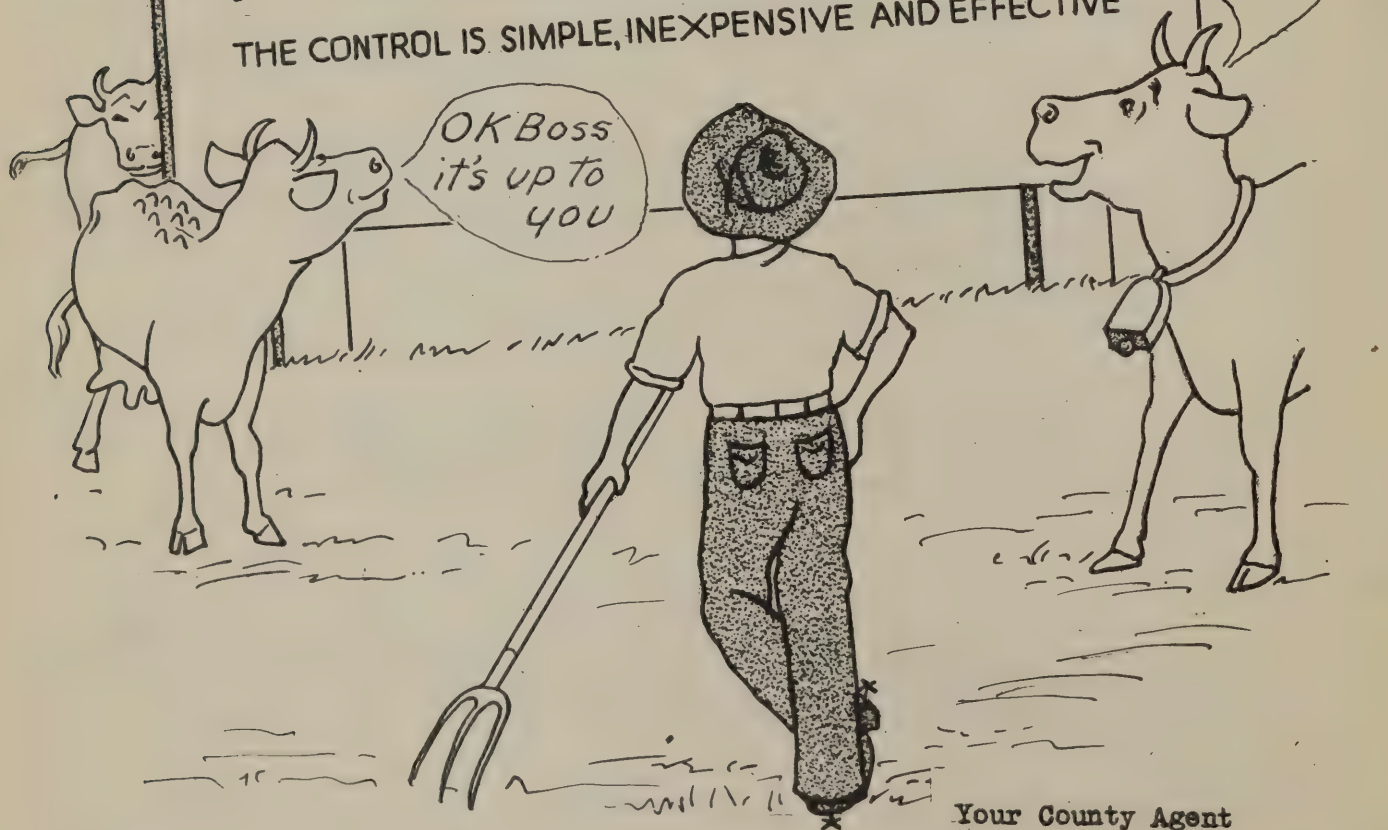
Cattle grubs don't drink milk but they might as well. Many a cow would give more if she were rid of those pesky things. Help her along and she'll repay you well. Ask your county agent.

- - 0 - -



## WAR DECLARED ON CATTLE GRUBS

A NATION-WIDE CONTROL CAMPAIGN IS NOW ON  
EVERYONE WHO OWNS A COW IS URGED TO VOLUNTEER  
THE ARMED FORCES NEED MEAT, MILK AND SHOES  
A LARGE INCREASE IN PRODUCTION IS NEEDED  
STOP THE TAX THE CATTLE GRUB IMPOSES ON YOU  
THE CONTROL IS SIMPLE, INEXPENSIVE AND EFFECTIVE



Your County Agent





#### ARE YOUR CATTLE GRUBBY?

If so, you can enlist in the fight against this enemy and help increase your profits, and at the same time help win this war.

Ever since that high-strung heifer hoisted her tail and headed for the bogs and the bushes last spring you have been feeding meat, milk, and leather to the grubs.

#### THAT MEAT, MILK, AND LEATHER ARE NEEDED IN WINNING THIS WAR

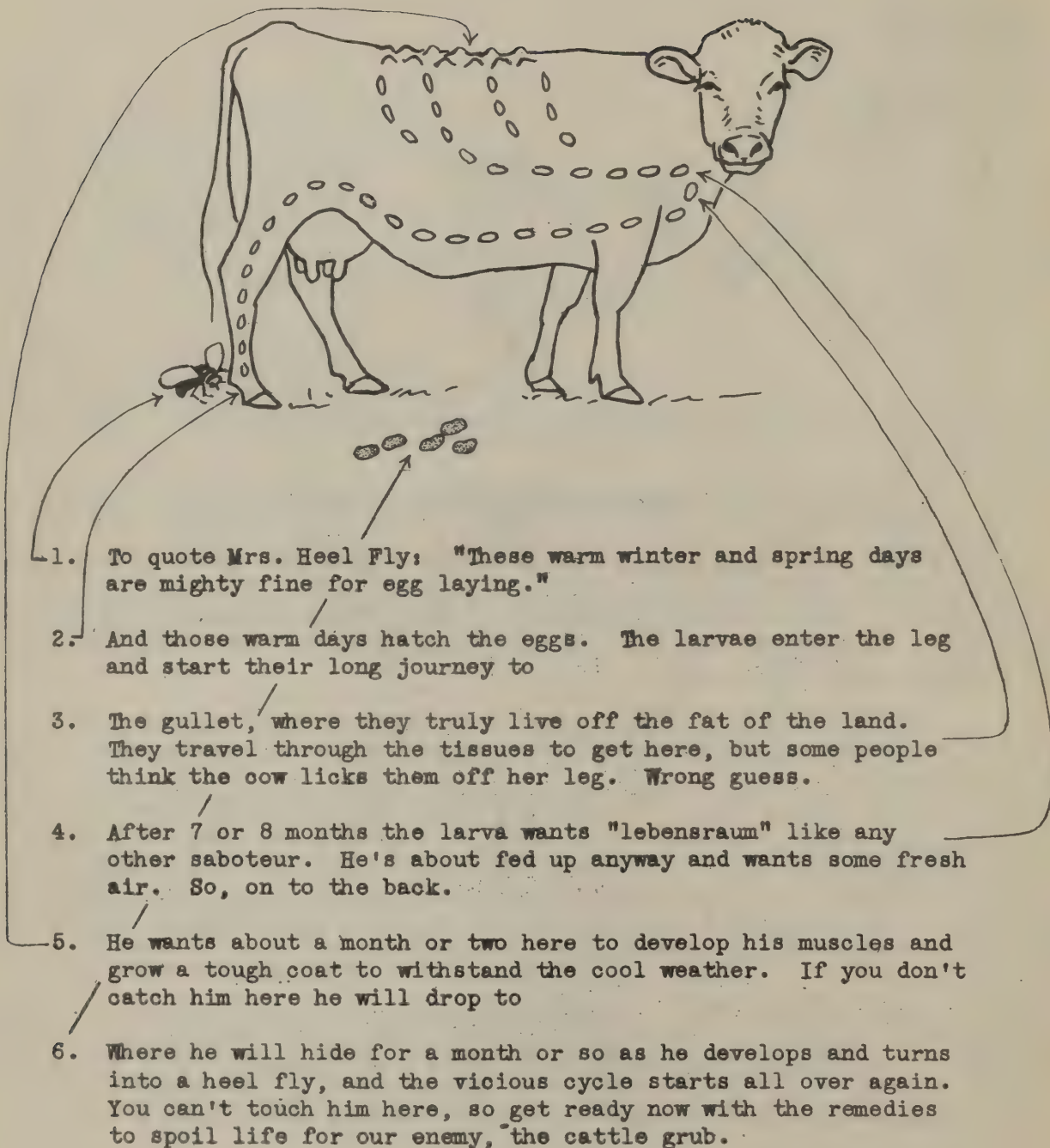
The flies that did the chasing last spring are the parents of the cattle grubs found in the backs of your cattle. These flies lay the eggs. Maggots hatch and start boring holes into the skin of your cattle. You are paying the bill. Cattle that stand around and stamp their feet and lick their heels do not produce as they should.

From the heel or lower part of the body the newly hatched maggots tour the body of the animal--at your expense. When you have thus fed the worms for 9 months they begin to need air. So they travel to the back, where are the best meat and the best part of the hide. From the inside out they cut holes in the hide and form pus pockets. Here in the back for the next 3 months the grubs accept your further hospitality--you are paying the bill. Thus they round out a year, their life cycle. Then they leave the back to rest for a month or so on the ground and turn into flies. The cycle starts all over again. You pay all the year-round board and lodging.

But when you want to stop paying there is a way out. The way out of this expense is simple, inexpensive, and efficient. The materials used are not harmful to anything on the farm except insects. Your county agent will be glad to help you and tell you how to control cattle grubs. Call on him for advice and ask him to help you organize a community cattle-grub control program.

Your County Agent





Your County Agent





Kill this maggot and you help cripple the other three.

When you control the grubs in the backs of your cattle you are not only helping yourself but you are also helping your country win a war. The men who are fighting for us need more beef, milk, and leather. The control is simple, safe, inexpensive, and effective.

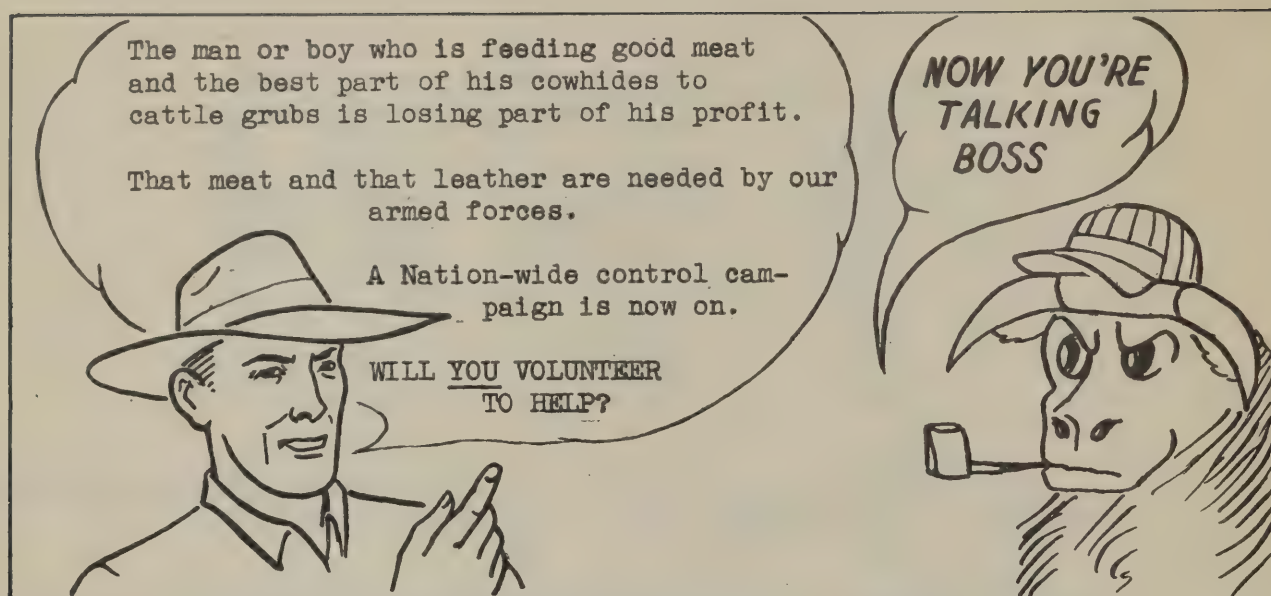
Hand extraction.--During the present emergency, farmers with only a few head of cattle would do well to squeeze out by hand the grubs they find in the backs of animals. By persistent effort it is possible to squeeze out all the grubs and prevent them from changing to heel flies.

Oilcan treatment.--Commercial benzol, when used in a common oilcan, has been useful in killing cattle grubs. The can should have a very small spout so that it can be inserted in the grub holes. About 20 drops of benzol is the desired amount to inject in each grub hole. This is the least amount you could inject with an oilcan with one squeeze. Benzol is inflammable, even more so than gasoline; therefore care must be taken not to expose it to fire.

Cattle grub powder.--Mix together by weight equal parts of either derris or cube containing 5 percent rotenone. Remove the top of a screw-topped jar, punch about 25 quarter-inch holes from the inside of the lid to make a shaker, and into this put the powder. Smaller holes would necessitate more shaking, which would waste material and would cause a cloud of dust irritating to the operator. One pound of dust will treat about 15 head of cattle. Repeat this treatment every 30 days from the time the first grubs are dark brown in color, and continue as long as the grubs show up in the back.

Your County Agent





Here are three things that you can do to help yourself and to help win the war:

1. Ask your dealer to stock the needed materials now.
2. Tell others about the need for grub control.
3. Treat your own cattle and show others how it is done.

The control is simple, safe, inexpensive, and effective. Following is a control recommended by your State and Federal Government. It is the same one used by some of your neighbors last winter. Ask them about grub control.

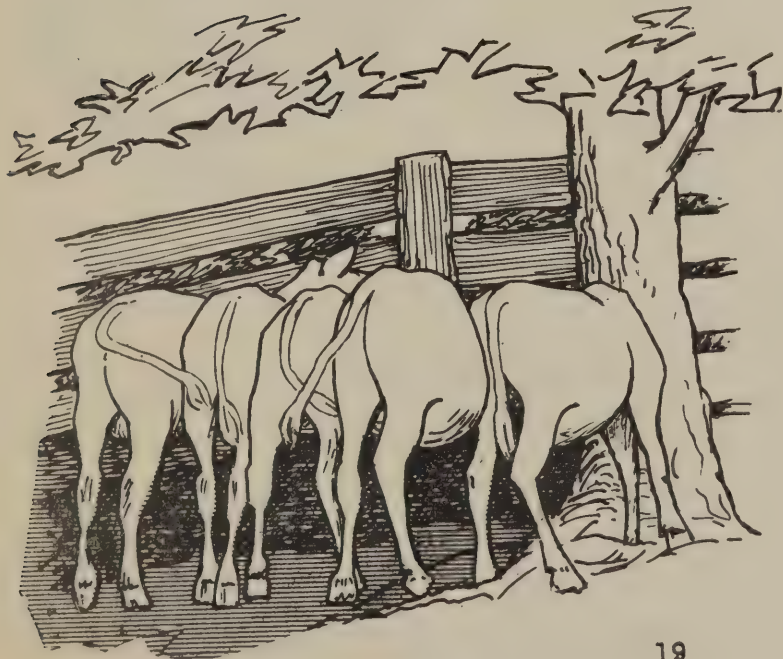
#### Spraying Method (Cube or Derris)

An ordinary power-operated orchard sprayer, with at least 250 pounds of pressure and a number 5 (5/64 inch) disk in the nozzle, will do the trick. One hundred gallons of the spray should treat from 150 to 175 head of cattle. Best results will be obtained by directing the spray to the backs of the cattle where grubs occur, holding the nozzle about 2 feet from the animal.

Mix 10 pounds wettable sulfur with 5 pounds of derris or cube powder (5 percent rotenone). Run 100 pounds of water into the spray tank. From this tank add enough water to the mixed powder to make it into a thin paste and pour the paste into the spray tank while the agitator is running.

Your County Agent

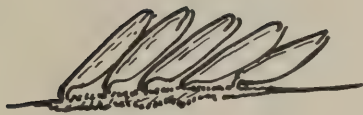








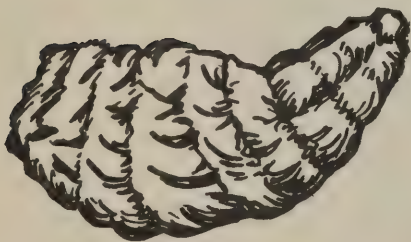




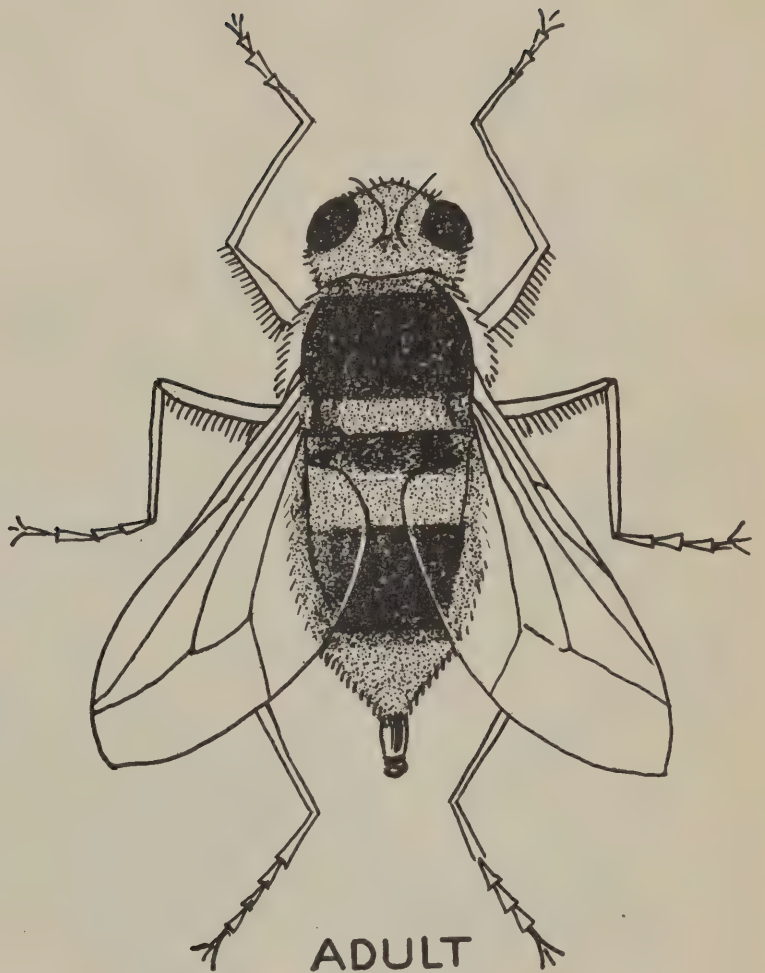
EGGS



LARVA



PUPA



ADULT

















